# Diverticulum of the Anterior Urethra: Report of an Acquired Type*

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A DIVERTICULUM is defined as "a pouch or pocket leading from a main cavity or tube."[1] It may be either a true diverticulum, in which case all layers of the viscus are present, or a false diverticulum, in which only the epithelial lining is present. These definitions pertain to diverticula of the urethra as well. They may vary in size from a capacity of a few cubic centimeters to over one hundred cubic centimeters. Any portion of the urethra may be involved (Fig. 1) but it is usually the floor of the urethra

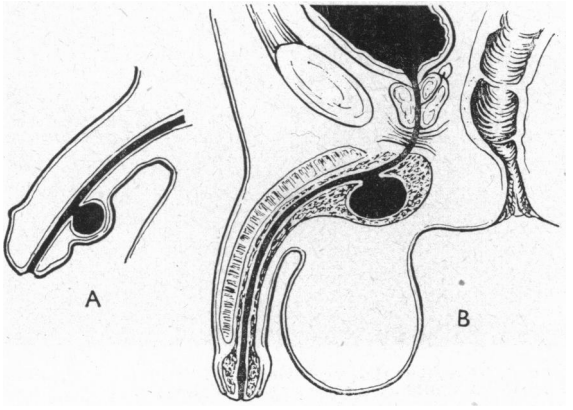


Fig. 1.—Possible locations of diverticula of the urethra. (B) shows location of diverticulum of case report.

from which the diverticulum takes origin, based on anatomical reasons.

Diverticula are more common in the female, possibly because of the trauma during delivery. Apparently the congenital type is less common than the acquired; Kretschmer[3] in 1936 found only 21 cases. In the acquired type the anterior urethra is less commonly involved than the posterior, probably due to the complexity of the latter. Fagerstrom[2] in 1943 reported only 19 cases of diverticula of the anterior urethra previously described from 1900 to 1942, and added two cases of his own to the literature.

Because of the relative rarity of acquired diverticula of the anterior urethra it was believed worthy of note to report an additional case.

## ETIOLOGY AND CLASSIFICATION

Since a discussion of the etiology of urethral diverticula involves classification these have been grouped together. The classification of Watts[5] gives the usual causes:

1. Congenital (Arises from ventral wall, usually anterior urethra).
2. Acquired (Usually from posterior urethra and in adults).
   a. From dilatation of the urethra proximal to stricture or calculus.
   b. From a false cavity formed after perforation of the urethral wall by injury or of a periurethral abscess into the urethra.
   c. From the pathologic distension of a normal structure such as the sinus pocularis, prostatic and paraurethral ducts.

In some cases the inciting cause cannot be defined, with no difference, of course, as to the treatment.

## ANATOMY, NORMAL AND ABNORMAL

The anterior urethra extends from the urethral meatus to the anterior layer of the triangular ligament. It runs in a cleft between the erectile bodies of the penis, the corpora cavernosa, and is surrounded by a semi-erectile sheath, the corpus spongiosum.[4] The urethra is supplied by three sets of nerves, the sympathetic (hypogastric), the parasympathetic (pelvic), and the somatic (pudic). The nerve supply follows no definite pattern and both the muscles of urinary control and the urethral walls are supplied by similar portions of both autonomic and somatic nervous systems.[2]

Following obstructions of the urethra, either from stricture or calculus, the urethra gradually distends, then may balloon out at a point of decreased anatomic support, usually on the ventral wall where the urethra is at its weakest. Once started, the distension probably increases fairly rapidly, aided by infection which is usually the case with faulty drainage of urine. Infection and trauma may destroy some of the layers of the urethra, thus changing a "true" to a "false" diverticulum. As the process extends, there results an elevation of the skin overlaying the diverticulum, of normal temperature and color unless there is peri-diverticulitis. Pressure on this pouch will cause the escape of urine from the urethral meatus when the diverticulum is in the anterior urethra, with resultant flattening of the pouch. End results of such infection, which may have associated obstruction, are cystitis, ureteritis and pyelonephritis, frequently with dilatation of the entire tract above the point of obstruction. Thus a local process may become one which ultimately endangers life itself.

## SYMPTOMS

The complaints of the patient are dependent upon the abnormal anatomy and physiology present. Difficulty in urinating, dribbling for minutes after the major part of the urine has been voided, the presence of purulent or bloody urine, and a noticeable mass on the underside of the urethra which empties on pressure, may all be present.

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General symptoms of malaise, chills and fever are possibilities.

### DIAGNOSIS

The diagnosis of diverticulum of the anterior urethra is usually easy to make and is based upon the easy palpation of that portion of the urethra. The presence of a mass on the ventral side of the urethra which empties on pressure with escape of fluid from the meatus is diagnostic. Other measures for more accurate localization and information as to complications would include urinalysis and Gram stain, plain x-ray or intravenous urography, blood chemistry study and phenosulphonphthalein for tests of renal function, followed by urethrography and cystoscopy with retrograde pyelography. By these means the complete diagnosis and treatment can be decided.

### TREATMENT

Small diverticula which do not contain more than a few cubic centimeters of uninfected urine and cause few if any symptoms do not require treatment if complicating factors are excluded. Larger diverticula and those with resistant urinary infections do require treatment. Suggested methods of treatment vary from dilatation of the diverticular orifice, which probably cures few, to excision of the diverticulum, which is the method of choice. Incision through scrotal or perineal skin is preferred, since there is less likelihood of urethral fistula formation. When the diverticulum is distal to the scrotum, diversion of urine by cystostomy should be done and indwelling urethral catheter avoided.

Preoperative and postoperative use of urinary antiseptics such as the sulfonamides should aid in decreasing infection and thus promote healing.

### CASE REPORT

A white male soldier, aged 31 years, was admitted to the 159th General Hospital in England, on December 24, 1944, with a complaint of painful urination of 22 days' duration. The past history was important and disclosed that in October, 1943, 14 months earlier, the patient had fallen on a rock, striking the perineum. This was followed by hematura for four days. Two months later he noted gradual decrease of force of the urinary stream, which had continued to the time of his entry into the hospital. Four months after the injury there was dribbling of urine after voiding, increasing in amount, and in the past few months he had noticed a perineal swelling. Pressure over this area caused the expulsion of about "one teaspoon of urine" from the meatus. The swelling occurred after urination. Twenty-one days before he entered the hospital the patient had fallen and had struck the right testis and perineum with a rifle butt. Bloody urine was voided three times after the injury, and urination had been more difficult and painful.

Results of physical examination were normal except for the genitalia. A cystic swelling of the mid-perineum, 1-2 cm. in diameter, was present after voiding. Pressure over this area caused urine to flow from the urethral meatus. Rectal examination disclosed normal sphincter tone and prostate of normal size and consistency.

Urinalysis: 3-5 pus cells, 5-15 red blood cells, per high power field.

X-ray study: Urethrogram (Fig. 2) showed stricture 1 cm. in length in the proximal third of the anterior urethra. There was a diverticulum 1 cm. in diameter arising from the floor of the urethra at the proximal end of the stricture.

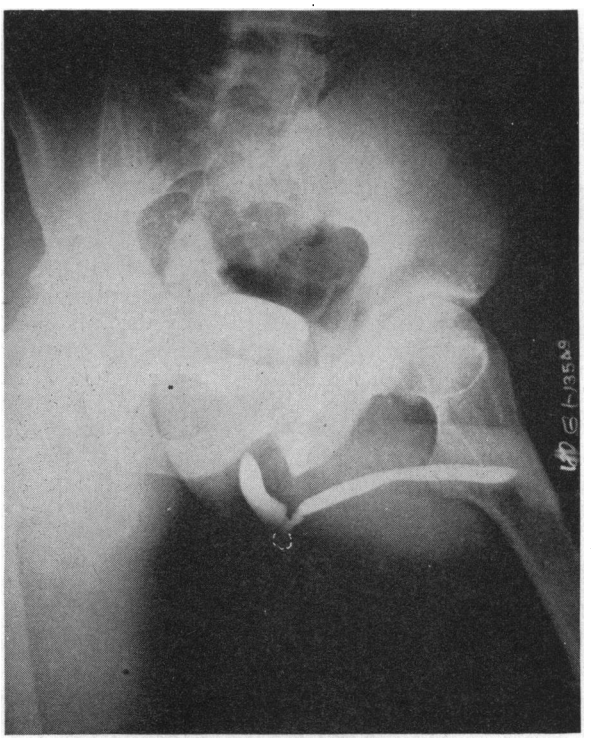

Fig. 2.—Preoperative urethrogram, left oblique, showing stricture of bulbous urethra and diverticulum proximal to it.

Cystoscopy: A No. 24 Brown-Buerger cystoscope met obstruction just proximal to the bulb. A No. 24 McCarthy pan-endoscope was passed to the bulb and visualized a stricture about 5 mm. in diameter at the bulbous area. The urethra distal to this was normal. On removal of the cystoscope a cystic mass 2-3 cm. in diameter was felt in the perineum, pressure on which caused a flow of fluid from the meatus.

Under direct vision with the pan-endoscope a filiform was passed through the stricture and the pan-endoscope removed. A No. 11 F. filiform follower was passed through an area of moderate resistance at the bulbous urethra. A No. 18 F. follower failed to pass with moderate pressure.

On January 11, 1945, and January 18, 1945, the stricture was dilated to 26 F. in calibre. Cystoscopy then revealed a shelf of scar tissue at the bulbous urethra, just proximal to which was a diverticulum 2-3 cm. in diameter on the floor of the bulbous urethra.

Diagnosis: 1. Diverticulum, ventral urethral bulb, 2-3 cm. diameter, associated with and secondary to

2. Stricture, urethral bulb, traumatic, moderately severe, incurred by perineal injury, October, 1943.

Treatment on February 6, 1945, consisted of urethral diverticulectomy. Procedure: Spinal anesthesia. The urethral stricture was dilated to 28 F. A mid-perineal incision 3 cm. in length was carried through the bulbocavernosus muscle to expose the thickened wall of the diverticulum, 2-3 cm. in diameter. The sac was dissected to the junction of the narrow neck with the bulbous urethra. The sac was excised, leaving an opening 3 mm. in length. The urethra was closed in two layers with 00 chromic catgut over a sound, avoiding the mucosa.

The bulbo-cavernosus muscle and Colles fascia were approximated with 00 chromic catgut. A split Penrose drain was placed to the bulb. Superficial tissue and skin were closed with No. 3 silk. A No. 20 F. Foley catheter was inserted as an indwelling urethral catheter.

The postoperative course was uneventful. The patient was given 4 gm. of sulfadiazine daily, and continuous catheter drainage was used. On February 14, 1945, the catheter was removed. The perineum healed rapidly and the patient was able to void freely without the dribbling which had bothered him previously.

Urethrogram (Fig. 3) on March 10, 1945: Complete absence of diverticulum previously described. Partial stricture present in proximal third of anterior urethra. deformity not as severe as on previous examination of January 8, 1945.

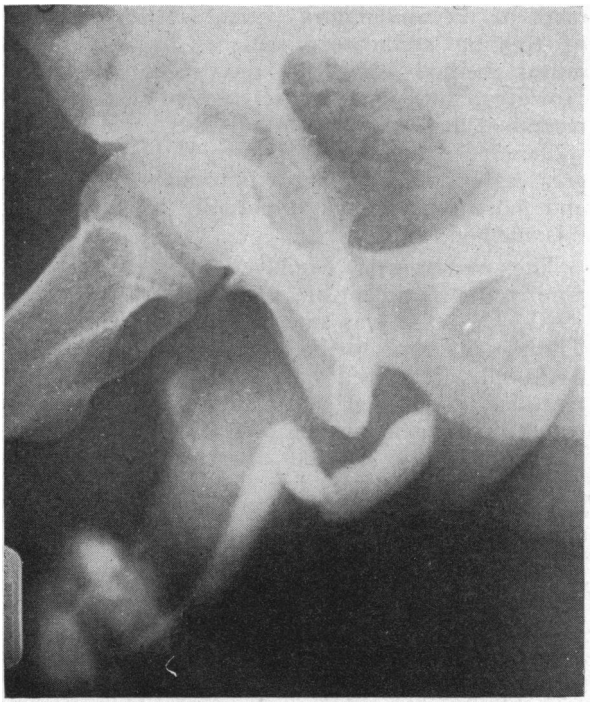

Fig. 3.—Postoperative urethrogram, right oblique, showing stricture dilated and absence of diverticulum.

### PATHOLOGIST'S REPORT

Pathological report by Captain Aaron Plachta, M.C.: Grossly the specimen consists of two portions of tissue measuring 1.3 x 1.0 x 0.3 cm. One surface is covered by an opaque pale gray smooth membrane. The other surface is irregular and dark brown. The cut section reveals a spongy, dark brown surface. Microscopic: The section consists of delicate, loosely arranged connective tissue fibers containing dilated capillaries. Scattered are occasional round cells. The epithelial covering shows blunt pegs, the cellularity of which is uniform. Diagnosis: Diverticulum of urethra.

### DISCUSSION

The case reported meets all the requirements as to the symptoms and physical findings in the usual case of urethral diverticulum. A combination of stricture plus local trauma to the proximal urethra is the ideal one for the production of a diverticulum, and such existed here. The history of repeated perineal trauma suggested the presence of a diverticulum and it was found.

It is not believed necessary to invoke the added factor of neurogenic dysfunction in this case, although Fagerstrom has presented two patients in whom diverticula of the anterior urethra developed following suprapubic prostatectomy and in whom he believes neurogenic dysfunction was the cause.

Treatment of this case followed the accepted method of excision of the diverticulum. in this case through the perineum, with drainage of urine through a urethral catheter. Healing was per primam. Future treatment is to consist of urethral dilatations to keep the stricture under control and prevent a possible recurrence of the diverticulum.

### CONCLUSION

Urinary symptoms of dribbling after voiding. obstructive symptoms, and especially the presence of an urethral diverticulum of the anterior urethra surface should immediately suggest the presence of a collapsible swelling on the ventral urethral. The condition is rare and usually is due to a combination of urethral obstruction plus local trauma, as was demonstrated in this case.

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